I. THE SELECTED REMEDY

Based upon the evaluation of the RI/FS completed in connection with this 12th St.-OU4, the RI/FS completed in connection with the KHL-OU3, other analyses performed in connection with the Kalamazoo River OU, and the nine criteria for remedy selection contained in the NCP, the MDEQ selects Alternative 2 as the remedy for the 12th St.-OU4. The RA shall insure that unacceptable exposure to PCBs will not occur. Construction details for Alternative 2 shall be part of the RD.

1. Excavation

Prior to any excavation in the woodland, wetlands, adjacent property, or the former powerhouse discharge channel, the horizontal and vertical extent of the PCB contamination shall be determined based on field reconnaissance and/or sample analyses. The east side of the landfill, along the former powerhouse discharge channel and the river, shall also be excavated and relocated further into the landfill. The excavation shall be extensive enough to create an adequate buffer zone to ensure that, for the lifetime of the remedy, no hydraulic connection exists between the PCB-contaminated wastes within the newly constructed landfill containment system and the Kalamazoo River/former powerhouse discharge channel. This buffer zone shall take into account potential changes in the direction and current of the river's flow. This buffer zone shall be of sufficient size to allow for the installation of and access to groundwater monitoring wells and to provide for a hydraulic separation between the waste and the surface water.

An excavation work plan shall be submitted to the lead agency for review and approval prior to initiating any excavation activity. The excavation work plan shall be based on the results of the pre-excavation sampling and/or field reconnaissance and shall include air and surface water monitoring provisions. Subsequent to work plan approval, all excavated material will be dewatered as necessary and disposed of in the landfill prior to construction of the cover and containment system.

Following post-excavation sampling, a determination whether additional response actions will be necessary for the areas outside that landfill will be made as part of the ROD for the Phase I portion of the Kalamazoo River.

Short-term surface water monitoring shall be conducted during all construction activities and excavation of materials from the landfill, woodland, wetlands, adjacent property, and the former powerhouse discharge channel in accordance with an approved monitoring plan. Surface water monitoring shall be conducted in order to assure that public health, safety, welfare, and the environment are being protected in accordance with state and federal law during implementation of excavation activities.

Air monitoring may be necessary during the RA activities**.** This monitoring may be necessary to ensure that the RA activities do not violate the rules prohibiting the emission of air contaminants in quantities which have injurious effects on human health, animal life, plant life of significant economic value, and/or property as established in Part 55, Air Pollution Control, of the NREPA.

Upon completion, the excavated areas shall be restored to their natural condition in accordance with an approved plan**.** Soil erosion shall be controlled compliant with state law during remedy implementation. Restoration of the wetlands pursuant to Part 303, Wetlands Protection, of the NREPA, shall also be carried out.

2. Cap

Under Alternative 2, a cap shall be placed in the landfill portion of the 12th St.-OU4 in compliance with the appropriate requirements of Part 115, Solid Waste Management, of the NREPA concerning cap specifications for closure of a solid waste disposal facility. The construction of the cap over the landfill will minimize infiltration of precipitation through the landfill and migration of PCB from the landfill into the groundwater, woodland, wetlands, adjacent property, and the former powerhouse discharge channel. The cap consists of the following components from bottom to top.

A layer of select granular fill at least six inches thick, from an off-site source, having a minimum hydraulic conductivity of 1 x 10^{-3} centimeters per second, shall be placed on top of the landfill as a suitable sub-grade for the cap. The need for a gas venting system will be evaluated in the RD process. If it is determined that a gas venting system is needed, this layer will be modified as approved by the MDEQ to also act as a gas venting layer. If so modified, this gas venting layer shall be designed to collect landfill gas (methane) and route it to a passive venting system. If it is determined that a gas venting system is required, it shall be monitored pursuant to an approved monitoring plan to determine whether emissions may cause potential health effects. If potential health effects are indicated, an

emission treatment system shall be placed in the venting system as directed by the lead agency to reduce the emissions to acceptable levels.

A polyvinyl chloride (PVC) geomembrane liner at least 30 mils thick, or its equivalent, will be placed over the select granular fill.

A general fill (protective) layer at least 24 inches thick will be placed above the 30-mil PVC, geomembrane liner. The protective layer will be capable of sustaining the growth of non-woody plants, and shall have adequate water holding capacity. The water that accumulates within this layer will drain to a sedimentation outlet structure and discharge to the Kalamazoo River.

A vegetative (erosion) layer at least six-inches thick will be placed over the protective layer. The vegetative layer will be designed to promote vegetative growth, provide surface water runoff, and minimize erosion. The feasibility of using vegetation that would provide habitat, such as native grasses, will be addressed in the RD.

3. Erosion Protection

Erosion protection shall be placed on the newly constructed side walls of the landfill. This protection shall be sufficient to protect the side walls from a 500-year flood event. The erosion protection shall extend, at a minimum, to an elevation of 707.0 feet above mean sea level (MSL), which is approximately two feet above the 100-year flood elevation.

Placement of erosion and flood protection on the side walls of the landfill is consistent with requirements of Part 115, Solid Waste Management,
Part 301, Inland Lakes and Streams, Part 91, Soil Erosion and Sedimentation Control, and Part 303, Wetlands Protection, of the NREPA.

4. Installation of Groundwater Monitoring System

Groundwater monitoring wells will be installed and wells that are no longer necessary will be properly abandoned. This groundwater monitoring system will be designed to detect any groundwater contamination from the landfill and will be developed as part of the RD in accordance with Part 201, Environmental Remediation, of the NREPA.

5. Long-Term Monitoring

Long-term groundwater monitoring shall be performed in accordance with an approved groundwater monitoring plan. The plan may require the installation of additional monitoring wells. The continued need for monitoring will be evaluated at the five-year review required under the NCP, and at each review thereafter, but shall continue until the lead agency, in consultation with the support agency, determines that such monitoring is no longer necessary. Monitoring of the groundwater aquifer under the landfill shall be conducted in accordance with Part 201, Environmental Remediation, of the NREPA.

6. Engineering Controls - Fencing

After the RA is completed, fencing shall be installed around the entire landfill portion of the 12th St.-OU4 in accordance with approved work plans.

7. Containment System

A containment system shall be constructed around the outside of the landfill. The existing sides of the landfill are constructed of sand, fly ash, and PCB-contaminated residuals. These sides were not designed to provide side slope stability, flood protection, or erosion control. The existing sides will be completely covered by the new containment system. The containment system shall be designed to prevent release of any PCB contamination. It must provide appropriate slope stability and flood and erosion protection. The containment system shall be designed, at a minimum, to meet the relevant provisions of Michigan Solid Waste Landfill closure regulations pursuant to Part 115, Solid Waste Management, of the NREPA. The containment system must be approved prior to construction.

8. Leachate Collection

During RD, an evaluation of the need for a leachate collection system shall be submitted for approval. The evaluation, at a minimum, shall consider the water content of the waste, the presence of perched water within the landfill, and the potential for and effect of waste settlement.

If it is determined that leachate collection is necessary, a leachate collection system as specified by the lead agency shall be included in the final design and it shall be operated to assure that the public

health, safety and welfare, and the environment are adequately protected.

9. Posting and Permanent Marker(s)

   Permanent marker(s) shall be placed at the landfill describing the restricted area of the 12th St.-OU4 and the nature of any restrictions. Warning signs will also be posted on the fence every 200 feet and on all entry gates. The number, content, and location of the permanent markers and warning signs shall be approved by the lead agency.

10. Deed Restrictions

    Deed restrictions approved by the lead agency shall be placed on the landfill area property to regulate future use of the landfill to protect public health, safety and welfare, and the environment.

11. Long-term Maintenance

    Long-term maintenance, post-closure care, and financial assurance as required by Part 201, Environmental Remediation, of the NREPA, shall be provided as part of this RA. A detailed O&M Plan shall be submitted as part of the RD. Once approved, long-term O&M shall be carried out pursuant to the plan.

12. Other Provisions

    Measures will be taken during remedy construction activities to minimize the noise and dust impacts of construction upon the surrounding community. Fugitive dust emissions will be monitored and controlled in a manner to ensure that they comply with the standards contained in Part 55, Air Pollution Control, of the NREPA.

13. Five-Year Review

    Because this remedy will result in hazardous substances remaining on-site above health-based and ecological-based levels, a review will need to be conducted within five years after commencement of the RA, and every five years thereafter. This review will be done to evaluate whether the remedy continues to provide adequate protection of human health and the environment and determine if any additional action is needed for the remedy to be protective.